

Applicants : Petar R. Dvornic et al.  
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#### REMARKS

Claims 35 and 36 have been amended. Claims 2, 12, 14, 24, 35 and 36 are pending and under consideration in the above-referenced application. All of the pending claims stand rejected.

#### Rejection Under 35 U.S.C. §112

Claims 2, 12, 14, 24, 35 and 36 stand rejected under 35 U.S.C. §112, first paragraph, on grounds that the claims fail to comply with the written description requirement. The Examiner has taken the position that the specification as originally filed does not disclose a curable composition comprising hyperbranched polymers and linear polymers that upon curing produce a cross-linked polymer network in which the hyperbranched polymer moieties are linked to other hyperbranched polymer moieties solely by linear polymer moieties bonded to the hyperbranched polymer moieties at the terminals of the linear polymer moieties.

Applicants recognize that they have not shown support in the original disclosure for the new or amended claims as encouraged under MPEP §714.02 and §2163.06. However, it is now submitted that support for the amendments can be found in the original specification at page 7, lines 4-15, which discloses curable compositions comprising hyperbranched polymers having reactive functional groups and linear polymer cross-linkers that are only reactive with the functional groups of the hyperbranched polymers via terminal groups. Additional support is provided at page 8, line 27 through page 9, line 2 which discloses curable compositions that can have only a single type of hyperbranched polymer having a single type of reactive functional group and a single linear cross-linker having only terminal functional groups that are reactive with the hyperbranched polymer. Finally, each of Examples 3, 4, 6, 9, 11, 13, 15 and 17 disclose curing a composition in which the only possible cure reactions are between a reactive functional group of a hyperbranched polymer molecule and a terminal reactive group on a linear polymer. In each of these examples, the cured product necessarily and inherently "a cross-linked polymer network in which hyperbranched polymer moieties are linked to other hyperbranched polymer moieties solely by linear polymer moieties bonded to the hyperbranched polymer moieties at the terminals of the linear polymer moieties," as required by the claims. No other type of linking between hyperbranched polymer moieties can

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occur under the conditions specified in these examples. The terminal moieties of the hyperbranched polymers in these examples can only react with the terminals on the alpha,omega-telechelic linear polymer cross-linker.

Attached is the Declaration of Petar R. Dvornic (Exhibit 1), which describes the above-noted examples and the resulting cured products.

In view of the above remarks and attached Declaration of Petar R. Dvornic (Exhibit 1), it is respectfully submitted that Applicants have met their burden of showing that the specification supports the amended claims. Accordingly, withdrawal of the rejection is requested.

Rejection Under 35 U.S. C. §102

Claims 2, 12, 14, 24, 35 and 36 Stand Rejected Under 35 U.S.C. §102(b) as being anticipated by Hedrick et al., *Macromolecules* 1997, 30, 7607-7610.

The Examiner has taken the position that the Hedrick article discloses a "cured" composition containing a hyperbranched polyether polymer having "reactive groups" and a "linear double chain ladder polymer" having reactive silanol end groups.

The claims have been amended to further distinguish over the teachings of Hedrick et al. which are limited to the disclosure of organic-inorganic hybrid composites comprising a hyperbranched polymer dispersed within an inorganic polymer matrix, e.g., a polysilsesquioxane. In particular, the claims have been amended to further distinguish over the compositions of Hedrick et al. by requiring that the cross-linked polymer networks are cross-linked by covalent bonds, and by requiring that the functional groups in the curable composition are covalently reactive. In contrast to the covalently cross-linked networks of the claimed invention, the Hedrick reference only alleges that there are interactions, especially hydrogen bonding, between the dispersed hyperbranched polymer molecules and the polysilsesquioxane matrix. These interactions do not constitute covalent bonds. Hedrick et al. do not teach or suggest the claimed compositions involving covalent bonding between a hyperbranched polymer and a linear polymer cross-linker to form a cross-linked network.

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The attached Declaration of Petar R. Dvornic (Exhibit 1) explains differences between the claimed cross-linked polymer network and the composites disclosed by the Hedrick et al. reference.

Support for the above amendments, in which the cross-linking between the hyperbranched polymers and the linear polymer cross-linker is achieved "covalently" is provided at page 3, lines 17-21 of the original specification, which states as follows:

Nano-domain-structured networks are prepared in accordance with an aspect of this invention by covalently connecting one or more multi-functional hyperbranched polymers with one or more chemical species having a plurality of functional groups that are reactive with the functional groups of the hyperbranched polymers, and are therefore capable of forming polymer networks with the hyperbranched polymer (i.e., cured or cross-linked polymers).

In view of the above amendments and remarks, and further in view of the attached declaration, it is respectfully submitted, that the claimed invention is neither anticipated nor obvious based on the teachings of Hedrick et al. Accordingly, withdrawal of the rejection is requested.

#### Obviousness-Type Double Patenting Rejection

Claims 2, 12, 14, 24, 35 and 36 stand rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-12 of U.S. Patent No. 6,534,600, claims 16-56 of U.S. Patent No. 6,646,089 and claims 1-15 of U.S. Patent No. 6,812,298.

It is respectfully submitted that the obviousness-type double patenting rejections have been overcome by filing of the attached terminal disclaimers in compliance with 37 CFR 3.73(b).


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CONCLUSION

In view of the above remarks and attachments, it is respectfully submitted that the application is in condition for allowance and notice of the same is earnestly solicited.

Respectfully submitted,

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Date

  
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